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(71)Applicant : HITACHI LTD
HITACHI DEVICE ENG CO LTD

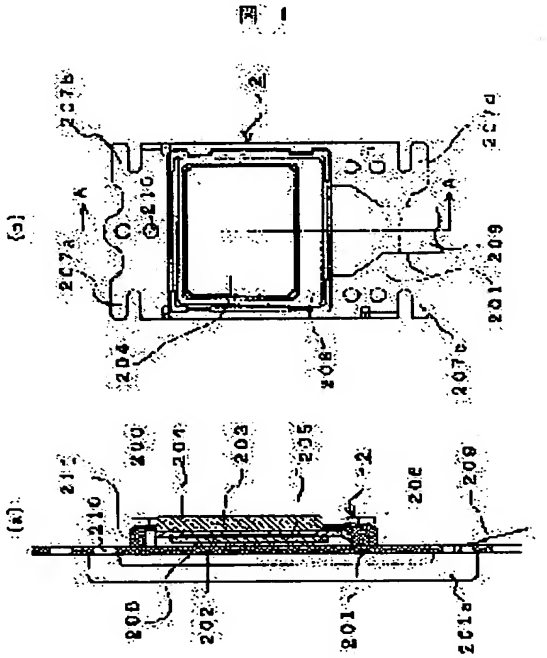
(72)Inventor : SHIRAISHI MIKIO
TAKEMOTO KAYAO
IGUCHI TSUDOI
HASEBE TATSUMI
TAKEUCHI YOSHIMASA

i4) PANEL, PANEL BUILT-IN STRUCTURE, OPTICAL UNIT, DISPLAY DEVICE AND FIXING METHOD

i7)Abstract:

ROBLEM TO BE SOLVED: To provide a repairable fixing structure of a ght valve means and to prevent the positional shift after fixation of a quid crystal projector.

OLUTION: A metal brazing segment 207 is provided on a portion of a upporting part of a light valve panel 2 to fix the same by soldering a older for holding a prism part. The movement of the light valve 2 after ne fixation with respect to a base 201 may be prevented and the ositional shift of the image to be projected may be prevented by forming ne structure in the manner described above. The removal of the light alve panel 2 is made possible and maintenability is improved by removing ne soldering. Further, the ratio of the coefficients of linear expansion of ne material constituting the light valve panel and the base segment upporting the same is specified between 1 to 3 and the positional shift of ne image to be projected is prevented by temperature cycles.



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LAIMS

:laim(s)]
:laim 1] The panel characterized by preparing the section with a brazing metal in the base material which supports the ght-valve element of a light-valve means.
:laim 2] The panel characterized by preparing the section with a brazing metal in one at the base material of a light-lve means.
:laim 3] It is the panel characterized by the aforementioned section with a brazing metal being fixed by the soldering eans in a panel according to claim 1 or 2.
:laim 4] The panel characterized by making other coefficient of linear expansion into within the limits of 1-3 when e minimum coefficient of linear expansion is set to 1 in a panel according to claim 1, 2, or 3 among the coefficient of ıear expansion of the liquid crystal display member prepared in the aforementioned light-valve means, and the oremention base material.
:laim 5] The panel characterized by making other coefficient of linear expansion into within the limits of 1-3 when it taches with a liquid crystal display member and the minimum coefficient of linear expansion is set to 1 among the efficient of linear expansion of supporter material.
:laim 6] The panel inclusion structure characterized by fixing to an object the light-valve means which prepared the azing-metal attachment weld in the supporting-structure portion by one by the brazing-metal attachment means.
:laim 7] The panel inclusion structure characterized by preparing the section with a brazing metal in the base material hich supports a light-valve element, preparing the section with a brazing metal in the supporter holding an optical ember, and welding these the aforementioned section with a brazing metal by the means with a brazing metal.
:laim 8] It is the panel inclusion structure characterized by welding the aforementioned means with a brazing metal ith a pewter in a panel inclusion structure according to claim 6 or 7.
:laim 9] The optical unit characterized by preparing the section with a brazing metal in the base material of the oremention light-valve means at one, and welding the aforementioned section with a brazing metal to the supporter ılding an optical member with a brazing metal in the optical unit which projects the light from the light source on a ght-valve means through optical system.
:laim 10] The optical unit which is equipped with the following, projects the light modulated ith the aforementioned light-valve means by the aforementioned projection means, and is displayed as an image, and characterized by preparing the section with a brazing metal in the base material of the aforementioned light-valve eans at one. Lighting means. A separation means to divide the flux of light of the aforementioned lighting means into /o or more colors. A light-valve means by which incidence of the separated flux of light is carried out. A synthetic eans to compound the light of the aforementioned two or more colors by which outgoing radiation was carried out om the light-valve means, and a projection means.
:laim 11] Display characterized by fixing to an object the light-valve means which prepared the brazing-metal tachment weld in one at the supporting-structure portion by the brazing-metal attachment welding means.
:laim 12] Display characterized by projecting the light from the light source on a light-valve means through optical 'stem, preparing the 1st section with a brazing metal in the base material of the aforementioned light-valve means in e display which carries out incidence of the light from a light-valve means to a projection system unit, preparing the ıd section with a brazing metal in the supporter holding the optical member of the aforementioned projection system ıit, and welding the section with a brazing metal of the above 1st and the aforementioned title by the means with a ·azing metal.
:laim 13] It is the display characterized by a brazing-metal attachment welding means being a soldering means in splay according to claim 11 or 12.
:laim 14] Display characterized by using a panel according to claim 1, 2, 3, 4, or 5.

'laim 15] Display characterized by using a panel inclusion structure according to claim 6, 7, or 8.
'laim 16] Display characterized by using an optical unit according to claim 9 or 10.
'laim 17] The fixed method of the light-valve panel characterized by fixing to an object the light-valve means which epared the section with a brazing metal in the supporting-structure portion by one by the brazing-metal attachment eans.
'laim 18] It is the fixed method of the light-valve panel characterized by a brazing-metal attachment welding means ing a soldering means in the fixed method according to claim 17.

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ETAILED DESCRIPTION

)etailed Description of the Invention]
001]
'he technical field to which invention belongs] For example, especially this invention uses light-valve elements and ese elements, such as a liquid crystal panel, and projects an image on a screen with respect to a panel, a panel clusion structure, an optical unit, and display, it applies to display units, such as liquid crystal projector equipment, ıd a liquid crystal television, a projected type display unit, and it relates to suitable technology.
002]
)escription of the Prior Art] Conventionally, with light-valve elements, such as a liquid crystal panel, the light from e light sources, such as an electric bulb, is changed into the shade for every pixel, and is adjusted, and the projected pe display of the liquid crystal projector which carries out expansion projection of the picture is known by the screen c.
003] Moreover, what doubles the picture of a different color tone using two or more light-valve elements, and splays a color is known for the equipment of a certain kind of the projected type display. Generally in the display hich displays a color using the light-valve element of these plurality, a color is displayed as follows.
004] First, the spectrum of the light from the light source is carried out to two or more wavelength-range regions, and dissociates. And it becomes irregular by inputting each color band into a corresponding light-valve element, finally .ch color component after a modulation is compounded, and it displays as an image of a color. If the position of the cture for every color component is not correctly doubled in order to compound the picture of two or more color tones ıd to project as an image, a color gap will occur on the image compounded and made. For this reason, various ethods are proposed as adjustment and the fixed method of the installation position of a light-valve element of taking ıarge of each color component.
005] As this kind of the adjustment method, what is indicated by JP,10-10994,A, the international public 'esentation official report W098 / No. 27453 is known conventionally, for example. By this kind of adjustment ethod, it pastes up after adjustment to the middle plate which calls a frame board the liquid crystal panel which is a ght-valve element. Furthermore, the screw stop of this frame board is carried out to the fixed frame which a prism eans to compound each color component has pasted up. Moreover, when needs, such as a maintenance of the liquid ystal panel after adjustment and exchange, are made, by removing a screw stop, only the maintenance of a liquid ystal panel or prism, and the target liquid crystal panel or prism can be exchanged easily, and an expensive liquid ystal panel or expensive prism are not made useless. Furthermore, by this method, the picture position for every color ımponent can be doubled correctly. Moreover, the gap accompanying the temperature change of each member is 'evented by controlling each coefficient of linear expansion of a prism member, and a fixed frame and a frame board the fixed range. However, it cannot be said that it is fully solved after adjustment about movement between the ame boards and stationary plates in which the screw stop is carried out by a temperature change, vibration, etc., and e point which a color gap of the image which the picture position changed and was finally projected may generate by ovement between the square inside a liquid crystal panel, and a mould portion further.
'006] Moreover, as the another adjustment fixed method, it is indicated by the Japanese-Patent-Application-No. No. 1196 [11 to] official report, for example. By this adjustment method, since it is fixing to the prism means which is a nthetic means through the electrode-holder board which is an adapter plate of the liquid crystal panel after ljustment, the picture position for every color component can be doubled correctly. However, since the direct liquid ystal panel has pasted prism when the need for a maintenance arises by failure of a liquid crystal panel etc. after lhesion, it cannot be said that it is fully solved about the point that an expensive liquid crystal panel and expensive ism will be canceled. Moreover, it cannot be said that it is fully coped with about the point which a color gap may enerate on the image which the picture position changed and was finally projected by movement between the

ectrode-holder board after adjustment, and a liquid crystal panel, either.
007] Moreover, the liquid crystal panel itself is constituted by two kinds of members, the glass which is the pporting section supporting a liquid crystal portion, and the synthetic-resin material which is supporting the whole uare further. Two kinds of such material has much combination of the usual glass material and polycarbonate aterial as an object conventionally used as a general material, for example. In this case, unlike 7.7 to 80 about about 1 gure, the coefficient of linear expansion of each material is not fully recognized the point which a mutual position gap ay generate by the temperature change, and conventionally.
008]
roblem(s) to be Solved by the Invention] With the above-mentioned conventional technology of two affairs, it was ıt enough taken into consideration about the position gap between the fixed frame attached in prism, and the frame ıard which has pasted up the liquid crystal panel. Moreover, in the example of the publication of one affair after the ıove-mentioned conventional technology, it was not enough taken into consideration about the maintenance nature of liquid crystal panel. moreover, the point which there is a temperature cycle and movement of the installation portion r expansion and contraction may generate in an operating condition although the composition of the liquid crystal ınel itself is also made of the member from which coefficient of linear expansion differs as the above-mentioned chnical problem common to the example of a publication of three affairs -- it was not enough taken into consideration

009] Then, it is in the purpose of this invention offering the technology of solving the fault of the above-mentioned ınventional technology and preventing a gap of the installation position after installation of a light-valve element.
010] Other purposes of this invention are to offer the technology of preventing the intra plant transfers of the light-ılve element itself.
011]
leans for Solving the Problem] In order to attain the purpose of this invention, as installation structure of the light-ılve element which this invention offers, the soldering portion was prepared in the light-valve element structure itself, ıd it considered as the installation section of the case of a light valve, and one. Since the soldering portion was epared in the light-valve element itself by one, it attaches with a light-valve element and the position gap between the ctions is not generated. Moreover, coefficient of linear expansion of the case portion of a light-valve element and the ınstituent material of a light-valve element was made into the abbreviation EQC, and it considered as a means to event the position gap by the difference in expansion / contraction length by the temperature cycle. By having united efficient of linear expansion, it considered as a means to prevent a position gap of the pixel by the temperature cycle ithin a light-valve element.
012] Hereafter, it explains still in detail. In the 1st invention, the section with a brazing metal is prepared in the base aterial to which a panel supports the light-valve element of a light-valve means. In the 2nd invention, as for a panel, e section with a brazing metal is prepared in the base material of a light-valve means at one. The aforementioned ction with a brazing metal is fixed by the soldering means in the 1st and the 2nd invention. Moreover, when the inimum coefficient of linear expansion is set to 1 among the coefficient of linear expansion of the liquid crystal splay member prepared in the aforementioned light-valve means, and the aforementioned base material, it is ınstituted so that it may become within the limits of 1-3 about other coefficient of linear expansion.
013] When it attaches with a liquid crystal display member and the minimum coefficient of linear expansion is set to among the coefficient of linear expansion of supporter material, a panel consists of the 3rd invention so that other efficient of linear expansion may be made into within the limits of 1-3.
014] In the 4th invention, a panel inclusion structure fixes to an object the light-valve means which prepared the azing-metal attachment weld in the supporting-structure portion by one by the brazing-metal attachment means. In e 5th invention, a panel inclusion structure prepares the section with a brazing metal in the base material which pports a light-valve element, prepares the section with a brazing metal in the supporter holding an optical member, ıd welds these the aforementioned section with a brazing metal by the means with a brazing metal. In the 4th and 5th vention, as for a panel inclusion structure, the aforementioned means with a brazing metal is welded with a pewter.
015] In the 6th invention, in the optical unit which projects the light from the light source on a light-valve means rough optical system, the section with a brazing metal is prepared in the base material of the aforementioned light-ılve means at one, and the aforementioned section with a brazing metal is welded to the supporter holding an optical ember with a brazing metal.
016] A separation means to divide the flux of light of a lighting means and the aforementioned lighting means into o or more colors in the 7th invention, A light-valve means by which incidence of the separated flux of light is carried ıt, and a synthetic means to compound the light of the aforementioned two or more colors by which outgoing diation was carried out from the light-valve means, It is the optical unit which has a projection means, projects the

ght modulated with the aforementioned light-valve means by the aforementioned projection means, and is displayed an image, and the section with a brazing metal is prepared in the base material of the aforementioned light-valve eans at one.

017] In octavus invention, display fixes to an object the light-valve means which prepared the brazing-metal achment weld in one at the supporting-structure portion by the brazing-metal attachment welding means. In the 9th vention, the light from the light source is projected on a light-valve means through optical system, in the display nich carries out incidence of the light from a light-valve means to a projection-system unit, the 1st section with a azing metal is prepared in the base material of the aforementioned light-valve means, the 2nd section with a brazing etal is prepared in the supporter holding the optical member of the aforementioned projection-system unit, and the ction with a brazing metal of the above 1st and the aforementioned title is welded by the means with a brazing metal. the octavus and invention of 9, a brazing-metal attachment welding means is a soldering means.

018] Furthermore, display is equipped with the panel, panel inclusion structure, or optical unit of invention entioned above as the 10th invention.

019] In the 11th invention, the fixed method fixes to an object the light-valve means which prepared the section with orazing metal in the supporting-structure portion by one by the brazing-metal attachment means. Moreover, in this ced method, a brazing-metal attachment welding means is a soldering means.

020]

mbodiments of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to awing using some examples. Hereafter, the 1st example of the panel by this invention, a panel inclusion structure, an tical unit, display, and the fixed method is explained using drawing 8 from drawing 1 . Drawing 1 is the block agram showing one example of the liquid crystal panel by this invention, drawing 1 (a) is the A-A cross section of awing 1 (b), and drawing 1 (b) is front view. In drawing 1 , a liquid crystal panel 2 is a thing of a gestalt which erates as a reflected type light-valve element. That is, it is reflected after becoming irregular inside a liquid crystal nel, and outgoing radiation of the light which carried out incidence to the optical ON outgoing radiation side 200 le of the light-valve panel 2, for example, a liquid crystal panel, is carried out from the same optical ON outgoing diation side 200, and it goes to the panel exterior. As shown in drawing 1 (a), the liquid crystal panel 2 is formed on e base 201, the liquid crystal layer 202 which performs liquid crystal operation is formed between the silicon bstrates 205 and cover glass 203 with which the drive circuit is prepared, and liquid crystal material is confined in ace with intervals, such as predetermined thickness, for example, 5 etc. micrometers etc. The silicon substrate 205 is ade of the silicon crystal which is the material which forms a semiconductor as the whole and performs circuit eration, and the liquid crystal side side (drive circuit side side), i.e., the field which adjoins the liquid crystal layer 2, in which the semiconductor which performs circuit operation is formed is polished to the mirror plane. The xible cable 209 is used for delivery of the electrical signal from the outside of a liquid crystal panel 2. It connects th the circuit portion of a silicon substrate 205, and the edge of the flexible cable 209 performs the display action of e picture as a liquid crystal panel 2 with the signal from the circuit side which is not illustrated. Image display eration of a liquid crystal side is performed by changing the polarization direction of light which changes the larization direction of liquid crystal material into it, applying voltage between the drive circuit by the side of a icon substrate 205, and the cover glass 203 which has prepared the transparent electrode which counters this, and is flected in it. The electrode is prepared corresponding to the two-dimensional pixel array corresponding to the screen, d a silicon substrate 205 can be displayed as a two-dimensional picture by driving a two-dimensional pixel ernatively.

021] Moreover, as shown in this drawing (b), the brazing-metal attachment sections 207a, 207b, 207c, and 207d are rmed in the edge of the base 201. In addition, in drawing, 210 is a screw hole for attaching the radiation fin entioned later, and 201a is ****** of the base 201.

022] Next, the internal structure of a liquid crystal panel is explained using the cross section drawing 1 (a) Shown. at conduction by which the silicon substrate 205 is constituted for example, from rubber for heat conduction to the se 201 -- it is supported through the member 208 Moreover, on both sides of the liquid crystal layer 202, cover glass 3 is pressed down with the panel frame 206 formed by synthetic resin etc., and this panel frame 206 is adhesion or ally [outsert] being fixed to the base 201 by fabrication to the base 201. Moreover, protection-against-dust glass 204 formed on cover glass 203, and the outside serves as the optical ON outgoing radiation side 200. Furthermore, tween the panel frame 206, a silicon substrate 205, and cover glass 203 (i.e., the dead air space of the panel frame 6 of drawing 1 (a)) is filled up with adhesives, and the silicon substrate 205 which is the liquid crystal display ction is being pasted up and fixed to it to the base 201.

023] In the example shown in this drawing 1 , when the silicon substrate 205 which constitutes Drive IC consists for ample, of a silicon-single-crystal substrate, coefficient of linear expansion is 4.15x10 to 6 cm/degree C. On the other

nd, when cover glass 203 and protection-against-dust glass are used as 1737 type glass, coefficient of linear pansion is 3.78x10 to 6 cm/degree C. Moreover, when the base 201 is constituted for example, from 42 alloy ıterial, coefficient of linear expansion is 4.6x10 to 6 cm/degree C. In this example, when coefficient of linear pansion of cover glass 203 and protection-against-dust glass is set to 1, the coefficient of linear expansion of other ɜmbers 205, i.e., a silicon substrate, and the base 201 is between 1-1.2. Thus, movement of the physical relationship each member by the temperature change can be prevented by arranging the coefficient of linear expansion of a imary member.

024] the member pasted up in this example -- although the example which is between 1-1.2 about the coefficient of ıear expansion of a between was explained, when according to the experiment coefficient of linear expansion of a ɜmber with least coefficient of linear expansion was set to 1 among primary members and the coefficient of linear pansion of other primary members was within the limits which is one to about three, it turns out that the same effect n be acquired

025] As shown in drawing 1 (a), it becomes irregular in the liquid crystal layer 202, it is reflected on silicon-substrate 15 front face, and outgoing radiation of the light which entered from the optical ON outgoing radiation side 200 is ain carried out from the optical ON outgoing radiation side 200 in the liquid crystal panel 2 exterior. In this case, in e silicon substrate 205 which are the liquid crystal layer 202 and a reflector, a light energy is absorbed and it comes heat energy. Generally, it is made of polymeric materials, and the temperature requirement which operates is stricted, for example, liquid crystal material has become a maximum of 70 etc. degrees C etc. For this reason, since it ɔps operating normally as a liquid crystal panel when the temperature of a liquid crystal side rises above to some tent, cooling is needed.

026] heat conduction which is made of heat-conduction elastomer material from the silicon substrate 205 with high ermal conductivity -- a member 208 -- minding -- the base 201 -- ** -- it is told The below-mentioned thermolysis eans, for example, a radiation fin, is prepared in the outside of the base 201, and cooling is performed. By doing in is way, the heat generated in respect of liquid crystal is taken out out of a liquid crystal panel, and it becomes ıssible to cool.

027] The brazing-metal attachment sections 207a-207b are formed in the outside four corners of the base 201, a azing metal, for example, solder etc., can be used for this portion, and it can weld to an object. The brazing-metal tachment sections 207a-207b enlarge thermal resistance as a part for the branch extended from the base 201 in the ınfiguration of the brazing-metal attachment sections 207a-207b so that the heat of solder may not get across to a ıuid crystal side at the time of welding. Furthermore, by clamping the root for a branch by another member, and ıplying a heat block at the time of soldering, if it is made for the heat of solder not to get across to a liquid crystal ıe, it is suitable. Moreover, as a mounting arrangement of four installation portions, it attaches one place at a time in der, and preventing heat deformation of the base 201 comes out by going. Moreover, by removing one solder at a ne in order, removal at the time of a maintenance can also prevent heat deformation, and can remove the base 201.

028] Drawing 2 is the perspective diagram showing the appearance of the liquid crystal panel shown in drawing 1 . ıe liquid crystal panel 2 is formed on the base 201, and the brazing-metal attachment sections 207a-207d have rmed it in the four corners of the base 201. After performing the position of the liquid crystal panel 2 whole, and ljustment of a posture, between these soldering sections 207 and the below-mentioned supporters is welded by the azing metal, and it fixes.

029] Drawing 3 is the perspective diagram showing one example of the display by this invention, and this display is display unit which used the liquid crystal panel. The optical unit is held in the interior of a display unit 1, and the ıuid crystal panel is attached in this optical unit. In the display unit 1 to illustrate, it is exposed to the exterior of the ıeathing box of a display unit 1, and the projector-lens means which is a part of projection-system unit 500 is ojected on an image by the external screen etc. from this projector-lens means. Moreover, ahead an inlet port 110 is rmed, the exhaust port 111 is formed in side back, and the air which took in the open air from the inlet port 110, and ɔt warm after cooling the interior of equipment is discharged from an exhaust port 111 to the equipment exterior. peration of equipment is performed by the operation button's 113 performing or receiving the manipulate signal from e outside by the remote-operation receive section 117. Moreover, a handle 122 is used at the time of movement of ıuipment.

030] Drawing 4 is a perspective diagram by the side of the base of the display shown in drawing 3 . The exchange lid 14 of the light source is formed, this lid 114 is opened and the light source is exchanged for the base side of a display ıit 1. Moreover, the adjustment foot 112 and the adjustment foot 115 which adjust the angle of the image which ljusts and projects the installation angle of the whole equipment have prepared. The height of these two feet 112,115 adjusted and fine tuning of the position of an image or an inclination which projects is performed. The video signal om the outside is inputted into equipment 1 from an input terminal 118 or an input terminal 120. Moreover, a power

pply is inputted from the power supply connector 119. Other remote-operation receive sections 116 have prepared so in the equipment back side, and it operates like the receive section shown in drawing 2 .

031] When Feet 121a and 121b are formed in the position higher than the above-mentioned input terminal, have a ndle 122 in the opposite side of the handle 122 shown in drawing 3 and it puts on a floor line etc., drawing 5 nstituted so that input terminals 118 and 120 etc. may not receive an injury is the perspective diagram showing one ample of the internal configuration of the optical system of the display shown in drawing 3 . In drawing, the larization direction is arranged through the optic 153 to which the flux of light of the suitable quantity of light by hich outgoing radiation was carried out from the light source 151 changes from the integrator lens 152, other tegrator lenses, and a polarization sensing element first. And after penetrating a collimator lens 154, it is reflected by e reflective mirror 155. Furthermore, after being reflected by other reflective mirrors 156, incidence is carried out to polarizing prism 158 through a condensing lens 157. In a polarizing prism 158, it reflects to the polarization arranged forehand. It reflects to the specific polarization direction and the property of the reflector of this interior is penetrated another polarization direction.

032] and the light of the wavelength of the range of specification [the dichroic mirror side which light progresses to e 1st prism 159 and is located in an outgoing radiation side] -- more for example, the light of the range of 400 to 0nm and the light of the so-called blue component reflect, and, finally it goes into liquid crystal panel 2B for blue It reflected by the outgoing radiation side side of the 2nd prism 160, and the light of a red component (**, **, the range 600 to 700nm wavelength) goes into liquid crystal panel 2R for red. And incidence of the light of the remaining een components (for example, the range of 500 to 600nm wavelength) is carried out to liquid crystal panel 2G for een through the 3rd prism 161.

033] In each liquid crystal panel 2R and 2G and 2B, outgoing radiation of the reflected light of two kinds of a odulation being applied, and changing the polarization direction or not changing is carried out to the light which rried out incidence corresponding to the pixel arranged by two-dimensional in the liquid crystal side. And incidence the green component is carried out to a polarizing prism 158, for example through prism 161, 160, and 159. In a larizing prism 158, reflection with a reflective film or transparency is chosen, that into which the polarization rection was changed as opposed to the original polarization direction by the liquid crystal panels 2R and 2G like the int or 2B is penetrated by the polarization direction, and incidence is carried out to a projector lens 501. That into hich the polarization direction is not changed is returned to a light source [of even if it reflects] side.

034] The light of other two color components is also compounded by prism 160 and 159, incidence is carried out to a larizing prism 158, and incidence is further carried out to a projector lens 501. [as well as the light of the component the point] In this case, through a prism portion, the focal position of a projector lens 501 is set as the liquid crystal nel side, and is projected on the picture modulated by liquid crystal panels 2R and 2G and 2B as an image to the uipment exterior. In addition, in the composition of the optical system shown in drawing, optical system says the se where a projection lens is included, and at the time of [both] removing a projection lens.

035] Drawing 6 is the expansion perspective diagram of the prism section circumference of the optical system shown drawing 5 . Electrode holders 556R, 556G, and 556B have prepared in the outgoing radiation side side for every lor component of prism, respectively. And the liquid crystal panels 2R and 2G and 2B which take charge of each lor are attached in each electrode holder 556R, 556G, and 556B, respectively. A liquid crystal panel 2 and an ectrode holder 556 are welded and ******(ed) using a brazing metal, for example, solder.

036] Drawing 7 is the decomposition perspective diagram showing one example of the liquid crystal panel of awing 6 , and the fixed portion of prism. In drawing, liquid crystal panel 2G curse base 201, curse electrode-holder 56 with Sections 207a, 207b, 207c, and 207d, Sections 557a, 557b (not shown), 557c, and 557d are made to counter, d it solders. In this case, the soldering section is soldered, after adjusting the position and posture of liquid crystal nel 2G and deducing a position. Liquid crystal panel 2G curse the fused solder base 201 with surface tension, and it lls a Sections 207a-207d and soldering sections [of an electrode holder / 557a-557d] crevice. If solder returns to dinary temperature, it will become a solid-state and welding will be completed.

037] A radiation fin 558 is attached in the heat sinking plane side of the background of the base 201 of liquid crystal nel 2G using the screw hole 210 established in the base 201. Moreover, the 3rd prism 161 is inserted between the inting 559a, 559b, 559c, and 559d prepared in electrode-holder 556G, and adhesion fixation of between Jointing 59a, 559b, 559c, and 559d and the 3rd prism 161 is carried out with adhesives.

038] Drawing 8 is the perspective diagram showing one example at the time of assembling the liquid crystal panel d prism of drawing 7 , and fixing. Liquid crystal panel 2G curse base 201, it curses electrode-holder 556 with ections 207a-207d, between Sections 557a-557d is soldered, and the state where the solder section 560 was formed is own. In this state, liquid crystal panel 2G and the electrode holder 556 are being welded and fixed. In this state, quid crystal panel 2G are fixed with the 3rd prism 161 through an electrode holder 556. That is, since adhesion or

elding will be fixed, there is no element with which the gap after posture justification occurs between [all] the image splay portion of liquid crystal panel 2G, and the 3rd prism portion, and they can offer the equipment with which a sition gap does not occur.

039] Hereafter, the 2nd example by this invention is explained using drawing 13 from drawing 9 . Drawing 9 is the ock diagram showing other examples of the light-valve panel by this invention, drawing 9 (a) is the B-B cross section drawing 9 (b), and drawing 9 (b) is front view. In drawing 9 , a liquid crystal panel 3 is a thing of a gestalt which erates as a penetrated type light-valve element. That is, after becoming irregular inside a liquid crystal panel, the ght which carried out incidence to the optical plane-of-incidence 300 side of a liquid crystal panel 3 is penetrated, and itgoing radiation is carried out from the optical outgoing radiation side 301, and it goes to the panel exterior. As own in drawing 9 (a), the liquid crystal panel 3 is formed on the base 201, the liquid crystal layer 303 which rforms liquid crystal operation is formed between the TFT glass substrates 305 and cover glass 304 with which the ive circuit is prepared, and liquid crystal material is confined in space with intervals, such as predetermined ickness, for example, 5 etc. micrometers etc. The semiconductor is formed in TFT glass-substrate 305 front face. By plying voltage between the drive circuit by the side of the TFT glass substrate 305, and the cover glass 304 which is prepared the transparent electrode which counters this, the polarization direction of liquid crystal material can ange and can change the polarization direction of the light to penetrate. The electrode is prepared corresponding to e two-dimensional pixel array corresponding to the screen, and the TFT glass substrate 305 can be displayed as a o-dimensional picture by driving a two-dimensional pixel alternatively. Moreover, as shown in this drawing (b), the azing-metal attachment sections 207a, 207b, 207c, and 207d are formed in the edge of the base 201.

040] Next, the internal structure of a liquid crystal panel is explained using drawing 9 (a). The base 201 is pasted or e panel frame 306 is really [outsert] being fixed to the base 201 by fabrication. The TFT glass substrate 305 is put tween cover glass 304 and protection-against-dust glass 307, and these are pinched with the panel frame 306. oreover, the front face of protection-against-dust glass 307 established in the outgoing radiation side side of the TFT ass substrate 305 is the outgoing radiation side 301. Furthermore, it fills up with adhesives between the panel frame 06, the TFT glass substrate 305, and cover glass 304, and adhesion fixation of the TFT glass substrate 305 which is e liquid crystal display section is carried out to the base 201.

041] In the example shown in drawing 9 , when the TFT glass substrate 305 is constituted for example, from BK-7 pe glass, coefficient of linear expansion is 7.2x10 to 6 cm/degree C. On the other hand, when cover glass 304 and otection-against-dust glass 307 are also constituted from BK-7 type glass, coefficient of linear expansion is 7.2x10 to cm/degree C. Moreover, when the base 201 is constituted for example, from permalloy material, coefficient of linear pansion is 7.7x10 to 6 cm/degree C. In this example, if the coefficient of linear expansion of a primary member sets efficient of linear expansion of a member with the smallest coefficient of linear expansion to 1, the coefficient of ear expansion of other primary members will go into the range of 1-1.1. Thus, movement of the physical relationship each member by the temperature change can be prevented by arranging the coefficient of linear expansion of a imary member. Although this example explained the example which is within the limits of 1-1.1 about coefficient of ear expansion, if it is about one to three range in fact, it is enough and the same effect can be acquired.

042] As shown in drawing 9 (a), it becomes irregular in the liquid crystal layer 303, and outgoing radiation of the ght which entered from the optical plane of incidence 300 is carried out from the optical outgoing radiation side 301 the liquid crystal panel 3 exterior. When light penetrates a liquid crystal panel, in the TFT glass substrate 305 which e liquid crystal layer 303 and the drive transistor are formed, and is, a light energy is absorbed and it becomes heat ergy. That is, when the temperature of a liquid crystal panel rises working, the TFT glass substrate 305 expands, and mperature returns and contracts at the time of a halt. Operation of a liquid crystal panel 3 and a halt of operation will interlocked with, expansion and contraction will set, and the so-called heat cycle will start. However, since the TFT ass substrate 305, the cover glass 304 of the circumference, protection-against-dust glass 307, and the base 201 that is pporting these are arranged with the material of the coefficient of linear expansion of the predetermined range, it comes possible [preventing movement of a picture position to a heat cycle].

043] Since the brazing-metal attachment sections 207a-207d have prepared in the outside four corners of the base 01, a brazing metal, for example, solder etc., is used for this portion, and it becomes possible to weld to an object. arge thermal resistance is taken as a part for the branch extended from the base 201 in the brazing-metal attachment ctions [207a-207d] configuration so that the heat of solder may not get across to a liquid crystal side at the time of elding. Furthermore, by clamping the root for a branch by another member, and applying a heat block at the time of ldering, if it is made for the heat of solder not to get across to a liquid crystal side, it is still more suitable. Moreover, a four installation sections [207a-207d] mounting arrangement, it attaches one place at a time in order, and eventing heat deformation of the base 201 comes out by going. Moreover, even if it faces removal at the time of a aintenance, by removing one solder at a time in order, heat deformation can be prevented and the base 201 can be

moved.

044] Drawing 10 is the perspective diagram showing the appearance of the liquid crystal panel shown in drawing 9 . ıe liquid crystal panel 3 is formed on the base 201, and the brazing-metal attachment sections 207a-207d have rmed it in the four corners of the base 201. After performing the position of the liquid crystal panel 2 whole, and justment of a posture, between holding-these soldering sectionsa [207]-207d and below-mentioned prism electrode ılders can be welded by the brazing metal, and it can fix.

045] Drawing 11 is the perspective diagram showing other examples of the optical-system internal structure of the splay by this invention. In drawing, after the flux of light of the suitable quantity of light by which outgoing radiation as carried out from the light source 151 penetrates the integrator lens 152, the integrator lens 153, and a collimator ıs 401 first, it is reflected by the reflective mirror 407, and it penetrates a collimator lens 450, and is led to a dichroic irror 408. In a dichroic mirror 408, it separates into 2 color components, for example, red, and a cyano color mponent, and a red component is penetrated, and a cyano color component is reflected in the reflective mirror 412, d it leads to a dichroic mirror 409 to it, respectively. In a dichroic mirror 409, the cyano color component which rried out incidence is divided into a pan at 2 color components, for example, a green component, and a blue mponent, and a green component is reflected, and a blue component is penetrated to a condensing lens 405, and it ads to a relay lens 402 to it, respectively. Thus, it separates into two or more color component required for image pression of a color.

046] Incidence of the flux of light for every separated color component is carried out to the liquid crystal panels 3R, 3, and 3B which are light-valve meanses to take charge of each color component. That is, incidence of the red flux of ght reflected from the reflective mirror 412 is carried out to liquid crystal panel 3R via a condensing lens 404. cidence of the green flux of light by which incidence was carried out to the condensing lens 405 is carried out to quid crystal panel 3G. Moreover, the flux of light of the blue component by which incidence was carried out to the lay lens 402 lets a filter 419, the reflective mirror 410, a relay lens 403, the reflective mirror 411, and a condensing ıs 406 pass, and incidence is carried out to liquid crystal panel 3B. The picture is shown to the liquid crystal panels , 3G, and 3B of each color component by the drive circuit means which is not illustrated, as mentioned above, a ght-valve means becomes irregular and incidence of the incident light of each color component is carried out to the ojection-system unit 500. The prism means 451 as a synthetic means to compound the flux of light of two or more lor components is formed in the projection-system unit 500, and outgoing radiation of the flux of light finally odulated is carried out to the equipment exterior by the projector lens 501. Thereby, on a screen (not shown), pansion projection of the liquid crystal panel for each color display and the picture displayed on 3R, 3G, and 3B is rried out as an image.

047] Drawing 12 is the perspective diagram showing the composition of a prism periphery shown in drawing 11 . ectrode holders 556R, 556G, and 556B are formed in the prism 451 plane-of-incidence side, respectively. And the quid crystal panels 3R, 3G, and 3B which take charge of each color are attached in each electrode holder 556R, 556G, d 556B, respectively. The fixed soldering section 560 of a liquid crystal panel 3 and an electrode holder 556 is elded using the brazing metal, for example, solder.

048] Drawing 13 is the decomposition perspective diagram showing one example of the liquid crystal panel of awing 12 , and the fixed portion of prism. As shown in drawing, curse liquid crystal panel 3, cursed electrode-holder 6 with the section 207, the section 557 was made to counter, and it has soldered. In this case, after adjusting the sition and posture of a liquid crystal panel 3 and deducing a position, the soldering section 557 is soldered. The sed solder is cursed liquid crystal panel 3 with surface tension, and fills the crevice between the section 207 and the ldering section 557 of an electrode holder. If solder returns to ordinary temperature, it will become a solid-state and elding will be completed. Moreover, Jointing 559a-559d is formed in the electrode holder 556, while being this inting 559a-559d, prism 451 is inserted, and adhesion fixation of the prism 451 is carried out at Jointing 559a-559d.

049] Like, in the example of this invention, although the example described above using the liquid crystal panel as a ght-valve panel was explained, if other light-valve meanses other than a panel, for example, a very small mirror drive ethod, a laser address liquid crystal method, etc. modulate an incident light and can be projected as an image, a nsparency formula and a reflective formula can be applied similarly and can realize them. Moreover, although 3 so-lled board methods which use three light-valve meanses explained, even if it is a method using light-valve meanses, ch as two sheets or one etc. sheet, having the same effect cannot be overemphasized. Although what is projected on a reen from a transverse plane was used as an example by explanation of the projected type equipment in this example, e same effect can be acquired even when it applies to the so-called tooth-back projection type equipment projected om a tooth-back side.

050] Although portability type small equipment was explained to the example, when it applies to the thing of the stalt which was united with the structure installed in the thing of the gestalt used fixing to a cover half, for example,

heater etc., or the outdoors, the building, etc. as explanation of the appearance of equipment, it cannot be eremphasized that the same effect can be acquired. Moreover, although explained as an example of brazing-metal achment taking the case of soldering, even if it is brazing metals, the brazing metal, for example, the aluminum wax, **, such as a brass wax, it cannot be overemphasized that it can carry out similarly. Furthermore, although 42 alloys d permalloy material were mentioned as an example as a material of the base portion made into a liquid crystal panel d one, it cannot be overemphasized that the thing of a coefficient of linear expansion required also from the material ** can be chosen easily.

051]

ffect of the Invention] As mentioned above, since according to this invention it attached with the light-valve panel d the brazing-metal attachment portion of a portion was unified, a position gap of the panel after fixation can be evented, and a brazing-metal attachment portion can be removed at the time of a maintenance, and a light-valve nel can be removed. Moreover, the position gap in the light-valve panel by the temperature cycle can be prevented having carried out coefficient of linear expansion in a light-valve panel within the limits of predetermined.

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NOTICES *

This document has been translated by computer. So the translation may not reflect the original precisely.
**** shows the word which can not be translated.
In the drawings, any words are not translated.

RAWINGS

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rawing 1]

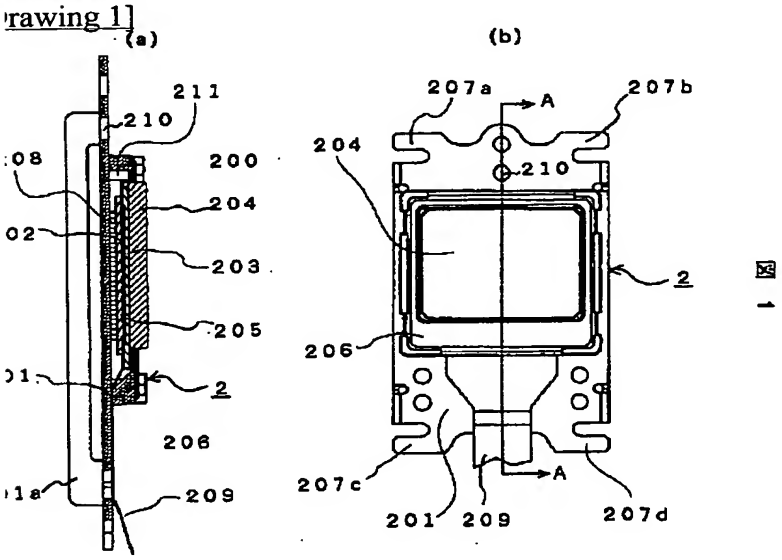
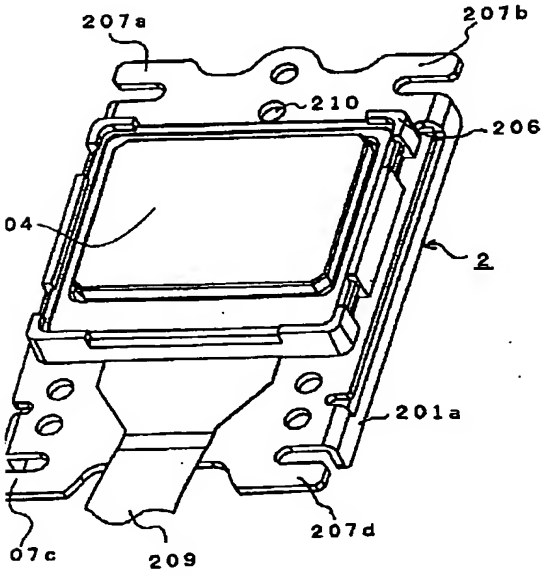


図 1

rawing 2]

図 2



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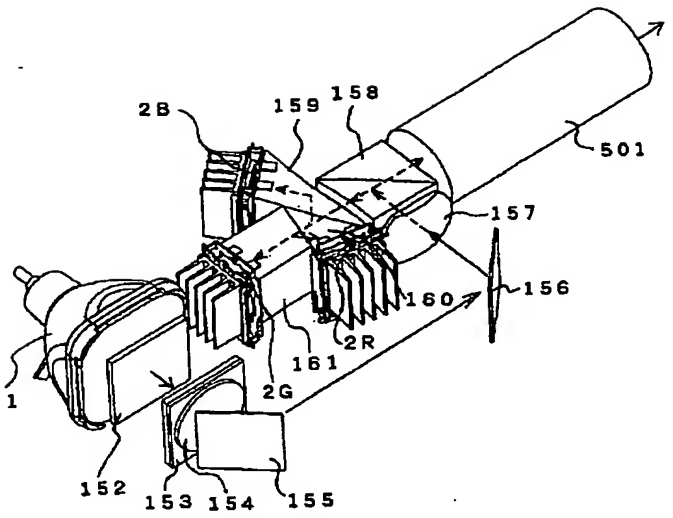

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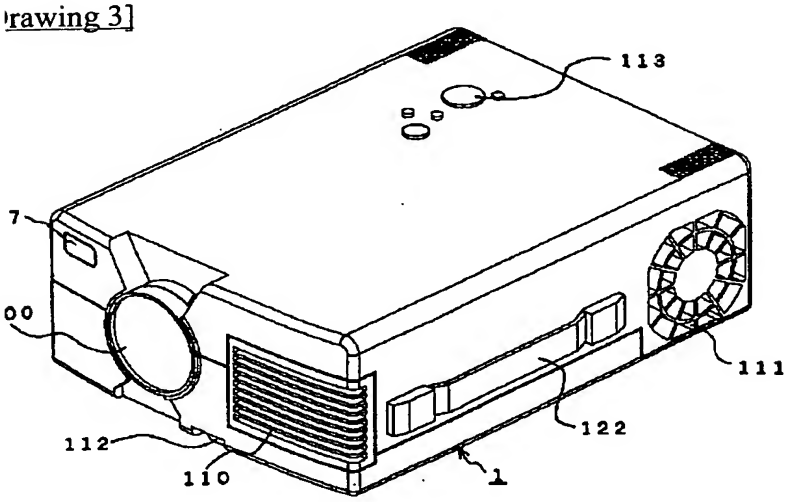
Drawing 3]



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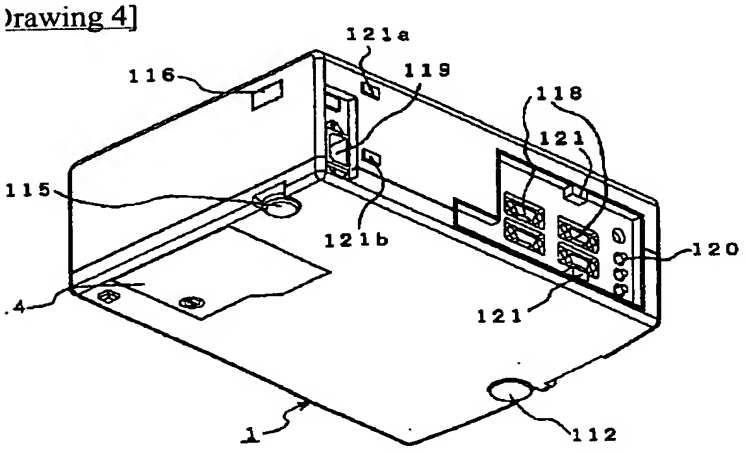

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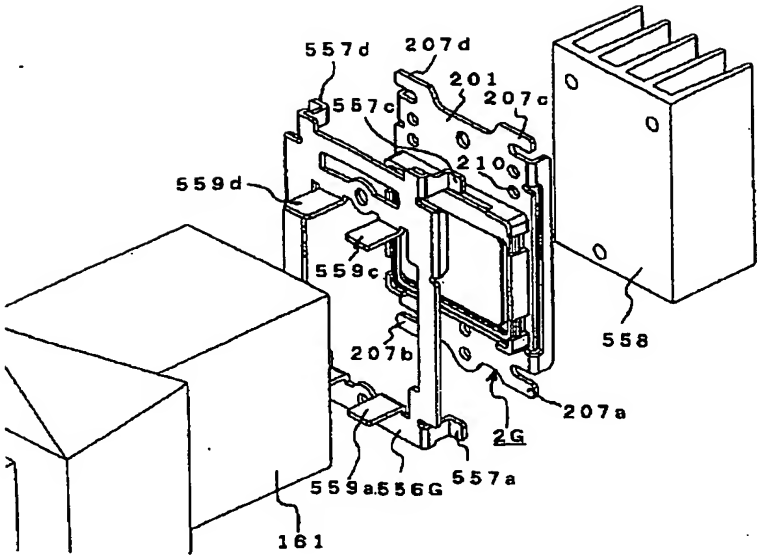
Drawing 7]



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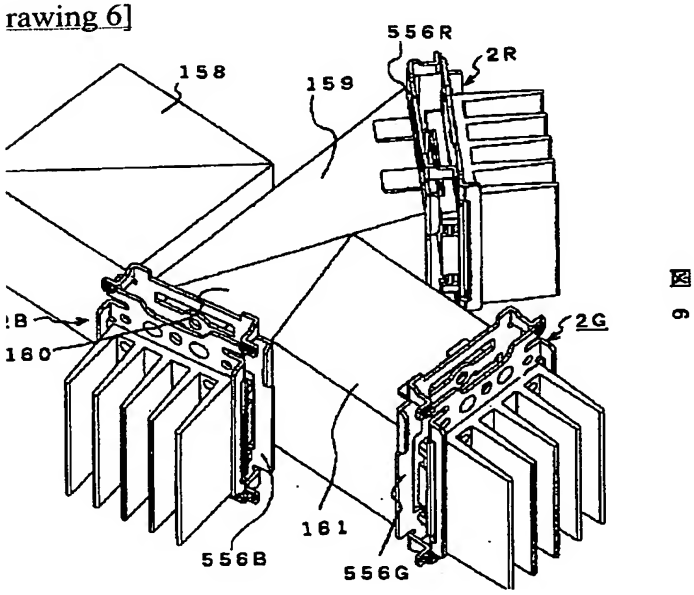

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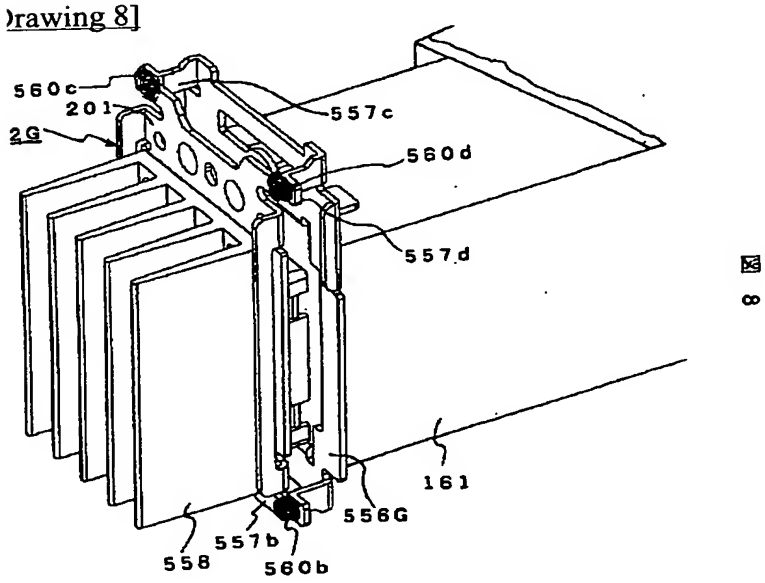

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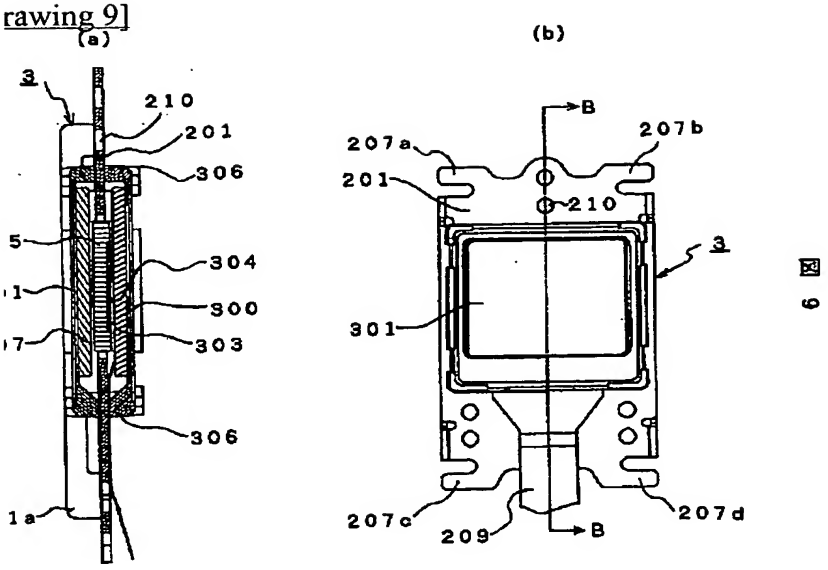
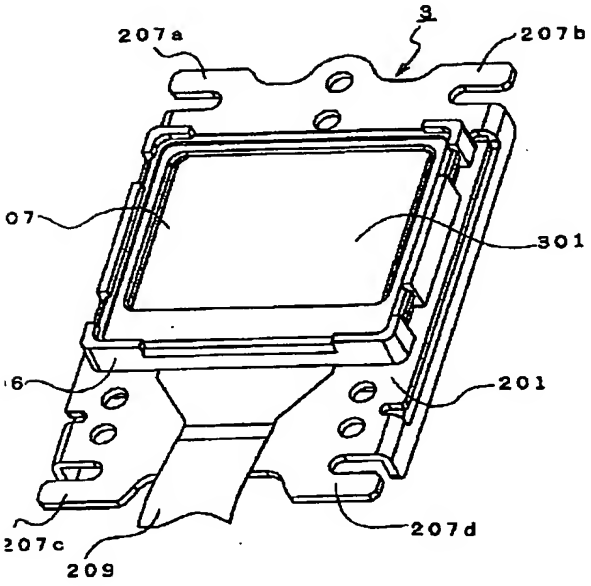


図 9

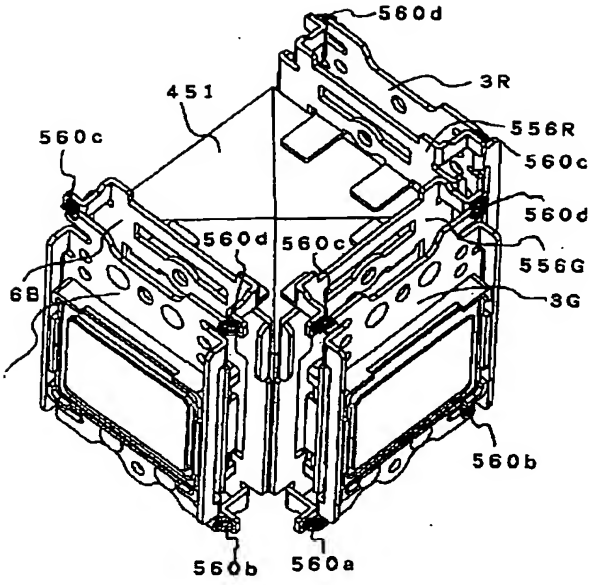
rawing 10]

図 10



Drawing 12]

図 12



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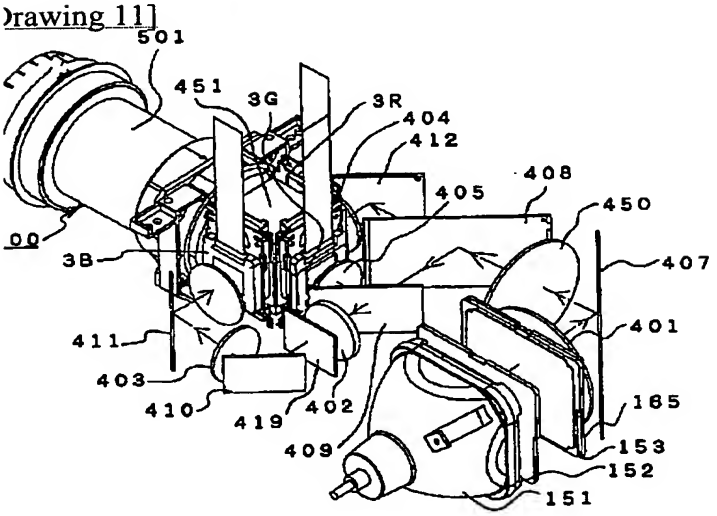

図 11

Drawing 13]

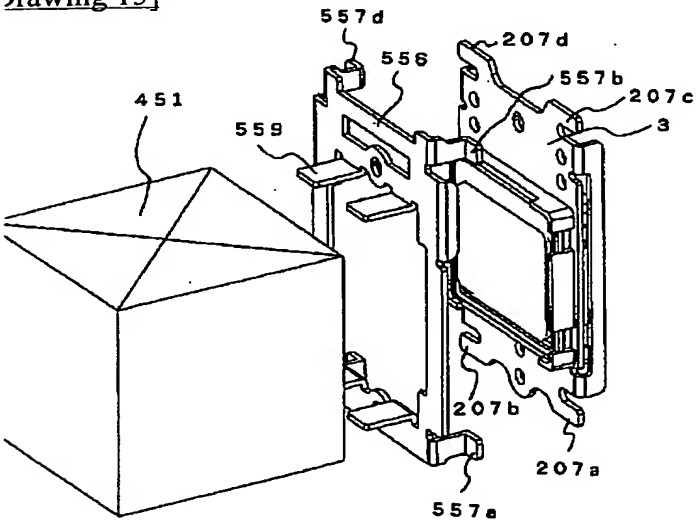

図 13

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